REMARKS

Claims 16-38 and 44-51 are pending in this application. Claims 45, 47, 49 and 51 have been amended.

I. Rejections under 35 USC §112

Claims 30-33, 34-38 and 47-49 are rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In response, each of the Examiner's stated reasons has been addressed in the foregoing arguments, and are briefly summarized below.

A. Regarding "the third structure"

The Office Action rejects claims 30-33 and 34-38 because the claim language involving "the third structure" is unclear. The Examiner states that "[b]oth the [third light guiding] waveguide (specification, page 11, lines 2-7) and the thermal compensation flexure (specification, page 12, lines 12-17) can be viewed as the third structure."

Claim 30 recites the following: "wherein the movable structure has a first and a second side, the second light guiding structure being mounted on the first side of the movable structure, and a third structure formed on the second side of the movable structure. . .". The Applicant would like to direct the Examiner to silica or oxide layer 156, depicted in FIGs. 11A-B, which is just one example embodiment of the third structure of claim 30. Silica or oxide layer 156 is formed on a second side of suspended structure 155 (see, for example, specification, pg. 20, lines 5-6). In this embodiment, suspended structure 155 is the movable structure having a first and second side, while patterned waveguide 157 is the second light guiding structure mounted on the first side of the movable structure.

With regard to the thermal compensation flexure (specification, page 12, lines 12-17), the application does not discuss forming a thermal compensation flexure on the second side of the movable structure. Therefore, the thermal compensation flexure (as defined in the specification, page 12, lines 12-17) is not the third structure referred to in claim 30. Nor is the third structure of claim 30 necessarily a waveguide since silica or oxide layer 156 is not necessarily a waveguide, but optionally might be.

Claim 34 recites "a third structure comprising the same material as the movable structure and formed on the second light guiding structure. . .". The Applicant would like to direct the Examiner to silicon top layer 122, depicted in FIGs. 9A-B, which is just one example embodiment of the third structure. Silicon top layer 122 comprises the same material as the silicon substrate 121 and is formed on the waveguide 120 as depicted in FIG. 9B. In this embodiment, waveguide 120 is the second light guiding structure and silicon substrate 121 is the movable structure in the center portion of FIG. 9A, as recited in claim 34.

With regard to the thermal compensation flexure (specification, page 12, lines 12-17), the application does not discuss forming a thermal compensation flexure on the second light guiding structure. Therefore, the thermal compensation flexure (specification, page 12, lines 12-17) is not the third structure referred to in claim 34. Nor is the third structure of claim 30 necessarily a waveguide since silica or oxide layer 156 is not necessarily a waveguide.

In light of the preceding remarks, the Applicant respectfully submits that claims 30 and 34 particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Applicant respectfully requests that the rejection to these claims, under 35 USC §112, be withdrawn. Because claims 31-33 and 35-38 depend from claims 30 and 34, respectively, the Applicant respectfully requests that the rejection to these claims be withdrawn as well.

B. Regarding "the thermal distortion offset structure"

The Office Action rejects claims 47-49 because the claim language involving the thermal distortion offset structure is unclear. More specifically, the Examiner states that "it remains unclear if the applicant is claiming that the thermal distortion structure contains both the first and second waveguide or if the thermal distortion structure contains only the second waveguide. In addition, it is unclear how the thermal distortion structure can be materially similar to the first waveguide but materially different from the second waveguide if both waveguides are located on the same thermal distortion offset structure."

Claim 44 recites a suspended structure having a first surface and a second surface on opposite sides of the suspended structure, a light guiding structure disposed on the first surface and a thermal distortion offset structure formed on the second surface. The Examiner states that it is unclear if the thermal distortion offset structure contains both the first and second waveguide. However, from claim 44 it is clear that the thermal distortion offset structure is formed on the

second surface, and the light guiding structure (or first waveguide in claim 45) is disposed on the first surface. Therefore, the thermal distortion offset structure cannot include the first waveguide because the thermal distortion offset structure and the first waveguide are on opposite sides of the suspended structure. In claim 48, the thermal distortion offset structure may include a second waveguide, but since claim 48 depends ultimately from claim 44, the thermal distortion offset structure of claim 44 does not necessarily include a second waveguide.

The Examiner also states that it is unclear how the thermal distortion offset structure can be materially similar to the first waveguide but materially different from the second waveguide if both waveguides are located on the same thermal distortion offset structure. It is well known in the art that structures composed of different material can be formed in different locations through patterning of deposited layers (specification, pgs. 19-20) in semiconductor processing. Therefore, it is possible to locate materially different waveguides on the same structure, which, for instance in claim 48, can be the thermal distortion offset structure. Certainly, while their materials may be the same, they may have different configurations.

In light of the preceding remarks, the Applicant respectfully submits that claims 47-49 particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. The Applicant respectfully requests that the rejection to these claims, under 35 USC §112, be withdrawn.

II. Objections to the Claims

In paragraph 3, the Examiner objects to claims 18-19, 26-28, 31-37, 45, 47-49 and 51 because it is unclear whether the Applicant is referring to planar waveguides or dielectric waveguides. The Applicant respectfully traverses this objection. The term "waveguide" refers to a light guiding structure formed by a semiconductor process, which includes a planar waveguide but excludes optical fibers.

The Examiner also rejects claims 31, 33, 46 and 50 for containing one or more terms having an insufficient antecedent basis. The Applicant respectfully traverses this objection. The Applicant wishes to point out that lack of antecedent basis occurs when a claim is indefinite, such as when a claim contains a limitation and it is unclear as to what element the limitation was making reference" [MPEP 2173.05(e)].

It appears to the Applicant that, in each case, the Examiner has issued the objection to a dependent claim which references an element that does not appear in a prior intervening dependent claim, despite the fact that the element has proper antecedent basis in the base independent claim. For instance, claim 31 is dependent on claim 30, which, in turn, is dependent on claim 23. Claim 23 introduces "a first light guiding structure" and claim 31 references "the first light guiding structure," but claim 30 does not reference "the first light guiding structure." The reference in claim 31 is proper, even though claim 30 does not explicitly reference "the first light guiding structure," because proper antecedent basis exists in claim 23. It is both clear and definite that "the first light guiding structure" referred to in claim 31 is the same light guiding structure referred to in claim 23. Because this same reasoning applies to the objections in claims 33, 46 and 50, the Applicant, therefore, respectfully traverses the objections to claims 31, 33, 46 and 50.

In paragraph 4, the Examiner objects to claims 30, 45, 47 and 51 for various informalities and suggests appropriate corrections. The Applicant thanks the Examiner for the suggested corrections and has implemented the suggestion with regard to claims 45, 47 and 51. More specifically, the term "first" has been inserted before the term "waveguide" in claim 45, line 2, claim 47, line 2 and claim 51, line 2. In light of the preceding amendments, the Applicant requests that the objections to claims 45, 47 and 51 be withdrawn.

With regard to claim 30, the Examiner suggests the insertion of the phrase "light guiding after the term "third." Because of the preceding discussion addressing the section 112 rejection of claim 30, the Applicant respectfully asserts that no amendment of claim 30 is needed to clarify "the third structure," which is not necessarily light guiding.

III. Rejections under 35 USC §102

A. Nishiyama et al. (U.S. Patent 6,169,826 B1)

Claims 16-20, 23-24 and 26-28 are rejected under 35 USC §102(b), as being anticipated by Nishiyama et al. (U.S. Patent 6,169,826 B1). The Applicant respectfully traverses this rejection. Nishiyama fails to teach, suggest or disclose all of the elements of claims 16-20, 23-24 and 26-28.

Claim 16 recites a "fixed structure having a base and an overhang portion which protrudes beyond the base, the overhang portion having dimensions such that when the optical device is subject to thermal distortion, the ends of the first and second light guiding structures maintain

alignment with each other to be capable of propagating an optical signal." The Action compares the stationary optical fiber holder 32 and the base plate 10 of Nishiyama, to the fixed structure and base of claim 16, respectively. However, Nishiyama does not teach, suggest or disclose the overhang portion recited in claim 16. Furthermore, the Action does not make any reference to the overhang portion in claim 16, nor does it point out any structure in Nishiyama that could be likened to the overhang portion.

Nishiyama discloses an assembled optical switch for optical fibers, using mechanical pins and opposing slots to counteract thermal distortion, and iron magnetic yokes to induce movement in the switch. In Nishiyama, the yoke portions 50a-e allow the magnetic coil to be wound on all sides as depicted in Figures 6A-C. However, these yokes do not protrude beyond the base or have dimensions such that alignment between multiple light guiding structures is maintained when the device is subject to thermal distortion. Nishiyama's pins are a brute force attempt to resist thermal distortion, rather than a way to compensate for and null out thermal mismatches. Therefore, Nishiyama clearly does not teach, suggest or disclose all of the elements of independent claim 16.

Claim 23 recites a fixed structure and a movable structure formed by a semiconductor process. The Action compares the stationary optical fiber holder 32 and the movable optical fiber movable holder 30 of Nishiyama to the fixed structure and movable structure of claim 23, respectively. However, Nishiyama does not teach, suggest or disclose forming the stationary optical fiber holder 32 or the movable optical fiber movable holder 30 by a semiconductor process as recited in claim 23. Nor can it because Nishiyama refers to optical fibers, not waveguides.

Nishiyama discloses an optical switch including various magnetic components assembled together. In Nishiyama, both the movable optical fiber movable holder 30 and stationary optical fiber holder 32 are composed of a soft magnetic ceramic (col. 5, lines 2-3 and lines 52-56), such as Manganese/Zinc ferrite (col. 5, lines 3-5). Nishiyama further discloses using soft magnetic ceramics that can be "machined finely" (col. 7, lines 53-56). Nishiyama is clearly directed towards a manufactured and assembled optical switch. In no way does Nishiyama disclose forming an optical device or any component thereof with a semiconductor process, much less the alignment of light guiding structures formed by a semiconductor process. Therefore, Nishiyama clearly does not teach, suggest or disclose all of the elements of independent claim 23.

As discussed above, Nishiyama does not teach, suggest or disclose all of the elements of

independent claims 16 and 23. Therefore, the Applicant submits that claims 16 and 23 are in condition for allowance. Furthermore, because claims 17-22 and 24-33 depend from independent claims 16 and 23, respectively, the Applicant submits that these dependent claims are in like condition for allowance.

B. Wu et al. (U.S. Patent 6,526,198 B1)

Claims 44, 46 and 50 are rejected under 35 USC §102(b), as being anticipated by Wu et al. (U.S. Patent 6,526,198 B1). The Applicant respectfully traverses this rejection. Wu fails to teach, suggest or disclose all of the elements of claims 44, 46 and 50.

Claim 44 recites a suspended structure having a first and a second surface on opposite sides, where a light guiding structure is disposed on the first surface and a thermal distortion offset structure is formed on the second surface of the suspended structure. Clearly, Wu does not disclose these elements of claim 44.

First, Wu does not disclose a thermal distortion offset structure. The Action compares the landing electrode 172 to the thermal distortion offset structure of claim 44. However, Wu clearly states that the function of the landing electrode is to "stop rotation of the torsion plate 11e without shorting to the bottom electrode 171" (col. 18, lines 59-62). Thus, the landing electrode 172 serves no thermal distortion offset characteristics. Furthermore, Wu does not disclose any other structure that can be considered a thermal distortion offset structure.

The action also compares the micromirror 12 and torsion plate 11e with the light guiding structure and suspended structure of claim 44, respectively. Even if one were to assume that this comparison is proper, which it is not, the micromirror 12 and landing electrode 172 are clearly not on opposite sides of the torsion plate 11e. In fact, landing electrode 172 is on an entirely separate structure (substrate 17). By contrast, claim 44 requires the first and second surfaces to be on opposite sides of the same suspended structure (see, for example, Fig. 10a). Further, Wu does not indicate how to prevent thermal distortion of the mirror. Also, Wu does not disclose any other structure that can satisfy this requirement of claim 44.

As discussed above, Wu does not teach, suggest or disclose all of the elements of independent claim 44. Therefore, the Applicant submits that claim 44 is in condition for allowance. Furthermore, because claims 45-51 depend from independent claim 44, the Applicant submits that these dependent claims are in like condition for allowance.

IV. Allowable Subject Matter

The Applicant appreciates the Examiner's suggestion that the subject matter of claims 21-22, 25, 29, 45 and 51 would be allowable if rewritten in independent form. However, in light of the preceding amendments and arguments, the Applicant respectfully submits that these dependent claims are in condition for allowance without amendment and in their current dependent form.

V. Conclusion

Prompt and favorable action on the merits of the claims is earnestly solicited. Should the Examiner have any questions or comments, the undersigned can be reached at (949) 567-6700.

The Commissioner is authorized to charge any fee which may be required in connection with this Amendment to deposit account No. 15-0665.

Respectfully submitted,

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